

Customer No.: 31561  
Application No.: 10/710,729  
Docket No.: 13135-US-PA

### REMARKS

#### Present Status of the Application

The Office Action rejected claims 1-7 under 35 U.S.C. 102(e), as being anticipated by Han (U.S. 2003/0155572 A1). The Office Action rejected claim 8 under 35 U.S.C. 103(a) as being unpatentable over Han in view of Sun (U.S. 6,936,848). The Office Action also rejected claim 9 under 35 U.S.C. 103(a) as being unpatentable over Han in view of Peng (U.S. 6,835,606).

Applicant has amended claim 1 and canceled claim 7 to more clearly define the present invention. After entry of the foregoing amendments, claims 1-6 and 8-9 remain pending in the present application, and reconsideration of those claims is respectfully requested.

#### Discussion of Office Action Rejections

*Applicant respectfully traverses the 102(e) rejection of claims 1-6 because Han (U.S. 2003/0155572 A1) does not teach every element recited in these claims.*

In order to properly anticipate Applicants' claimed invention under 35 U.S.C 102, each and every element of claim in issue must be found, "either expressly or inherently described, in a single prior art reference". "The identical invention must be shown in as complete details as is contained in the .... claim. Richardson v. Suzuki Motor Co., 868 F. 2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)." See M.P.E.P. 2131, 8<sup>th</sup> ed., 2001.

The present invention is in general related a low temperature polysilicon thin film transistor (LTPS-TFT) structure as claim 1 recites:

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Claim 1. A low temperature polysilicon thin film transistor (LTPS-TFT) structure disposed on a substrate, comprising:

a cap layer disposed over the substrate, wherein there is a gap between the cap layer and the substrate;

a polysilicon film disposed over the cap layer, wherein the polysilicon film comprises a channel region and a source/drain region on each side of the channel region, and the channel region is directly above the gap; and

a gate disposed above the channel region of the polysilicon film, *wherein the width of the gate is smaller than the average grain size of the channel region.*

Han fails to disclose, teach or suggest the width of the gate is smaller than the average grain size of the channel region. Han discloses a thin film transistor, as shown in Fig. 5D, including a buffer layer 2, an oxide layer 3, an air gap 10, a polysilicon layer 4B (channel), a source 6, a drain 7, a gate oxide layer 11 and a gate 12. In particular, the air gap 10 is provided to reduce heat transmission along a vertical direction. The solidification at the channel proceeds towards the center of the channel from the boundaries between the channel region and the drain and source regions (paragraph [0024]). Thus, grains of the channel laterally grow to fully fill out the active layer of the channel from the boundaries towards the center of the channel. However, Han does not teach or suggest that the gate has a width smaller than the average grain size of the channel region. Han just discloses forming an aluminum layer 12 as a gate electrode, but Han does not describe about the width of the gate electrode.

The office action points out that Han shows the width of the gate 12 is smaller than the grain size of the channel 4B in Fig. 5D. However, Applicant does not agree. This is because the drawing is a diagram for illustration, and thus the size, thickness and the like showing in the drawing may not be real unless it is emphasized in the specification. Moreover, in Fig. 5D, it is

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not shown that *the width of the gate 12* is smaller than the *grain size* of the channel 4B. Furthermore, Han discloses the grain size in the channel region is larger than 4um (about 4.6 um) (described in Table 1 and paragraph [0040]-[0041]) and the width of the gate is 10um (shown in Figs. 6 and 7). In other words, the width of the gate is *larger* than the grain size of the channel region in Han's reference which is contrary to that the width of the gate is smaller than the average grain size of the channel region as claim 1 recited.

In the LTPS-TFT of claim 1, the width of the gate is smaller than the average grain size of the channel region. In this way, the channel region of the thin film transistor is prevented from crossing the grain boundary so that the thin film transistor can have a better performance.

For at least the foregoing reasons, Applicant respectfully submits that independent claim 1 patently defines over the prior art reference, and should be allowed. For at least the same reasons, dependent claims 2-6 patently define over the prior art as a matter of law, for at least the reason that these dependent claims contain all features of their respective independent claim.

*Applicant respectfully traverses the rejection of claim 8 under 35 U.S.C. 103(a) as being unpatentable over Han in view of Sun (U.S. 6,936,848) and claim 9 under 35 U.S.C. 103(a) as being unpatentable over Han in view of Peng (U.S. 6,835,606) because a prima facie case of obviousness has not been established by the Office Action.*

To establish a prima facie case of obviousness under 35 U.S.C. 103(a), each of three requirements must be met. First, the reference or references, taken alone or combined, must

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teach or suggest each and every element in the claims. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references in a manner resulting in the claimed invention. Third, a reasonable expectation of success must exist. Moreover, each of the three requirements must "be found in the prior art, and not be based on applicant's disclosure." See M.P.E.P. 2143, 8<sup>th</sup> ed., February 2003.

Applicants submit that, as disclosed above, Han fails to teach or suggest each and every element of claim 1 from which claims 8 and 9 depend. Sun and Peng also fail to teach or suggest that the width of the gate is smaller than the average grain size of the channel region. Sun and Peng cannot cure the deficiencies of Han. Therefore, independent claim 1 is patentable over Han, Sun and Peng. For at the least the same reasons, its dependent claims 8 and 9 are also be patentable.

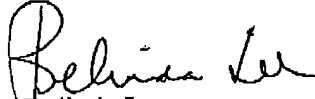
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**CONCLUSION**

For at least the foregoing reasons, it is believed that the pending claims are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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Respectfully submitted,

  
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